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Chapter 23: Diarrhea

INTRODUCTION

- Diarrhea is an increased frequency and decreased consistency of fecal discharge as compared with an individual's normal bowel pattern. It can be thought of as both a symptom and a sign of systemic disease.
- Acute diarrhea is commonly defined as shorter than 14 days' duration, persistent diarrhea as longer than 14 days' duration, and chronic diarrhea as longer than 30 days' duration. Most cases of acute diarrhea are caused by infections with viruses, bacteria, or protozoa, and are generally self-limited.
- Although viruses are more commonly associated with acute gastroenteritis, bacteria are responsible for more cases of acute diarrhea. Common causative bacterial organisms include *Shigella*, *Salmonella*, *Campylobacter*, *Staphylococcus*, and *Escherichia coli*. Acute viral infections are attributed mostly to the Norwalk and rotavirus groups.

CLINICAL PRESENTATION

- Acute diarrhea is usually self-limiting and subsides within 72 hours of onset, whereas chronic diarrhea involves frequent attacks over extended time periods. However, infants, young children, older people, and debilitated persons are at risk for morbidity and mortality with prolonged or voluminous diarrhea.
- Signs and symptoms include the following:
  - ✓ Abrupt onset of nausea, vomiting, abdominal pain, headache, fever, chills, and malaise.
  - ✓ Bowel movements are frequent and never bloody, and diarrhea lasts 12–60 hours.
  - ✓ Intermittent periumbilical or lower right quadrant pain with cramps and audible bowel sounds is characteristic of small intestinal disease.
  - ✓ When pain is present in large intestinal diarrhea, it is a gripping, aching sensation with tenesmus (straining, ineffective, and painful stooling).
  - ✓ In chronic diarrhea, a history of previous bouts, weight loss, anorexia, and chronic weakness are important findings.
- Physical examination typically demonstrates hyperperistalsis with borborygmi and generalized or local tenderness.
- Laboratory tests:
  - ✓ Stool analysis studies include examination for microorganisms, blood, mucus, fat, osmolality, pH, electrolyte and mineral concentration, and cultures.
  - ✓ Stool test kits are useful for detecting GI viruses, particularly rotavirus.
  - ✓ Antibody serologic testing shows rising titers over a 3- to 6-day period, but this test is not practical and is nonspecific.
  - ✓ Occasionally, total daily stool volume is also determined.
  - ✓ Direct endoscopic visualization and biopsy of the colon may be undertaken to assess for the presence of conditions such as colitis or cancer.

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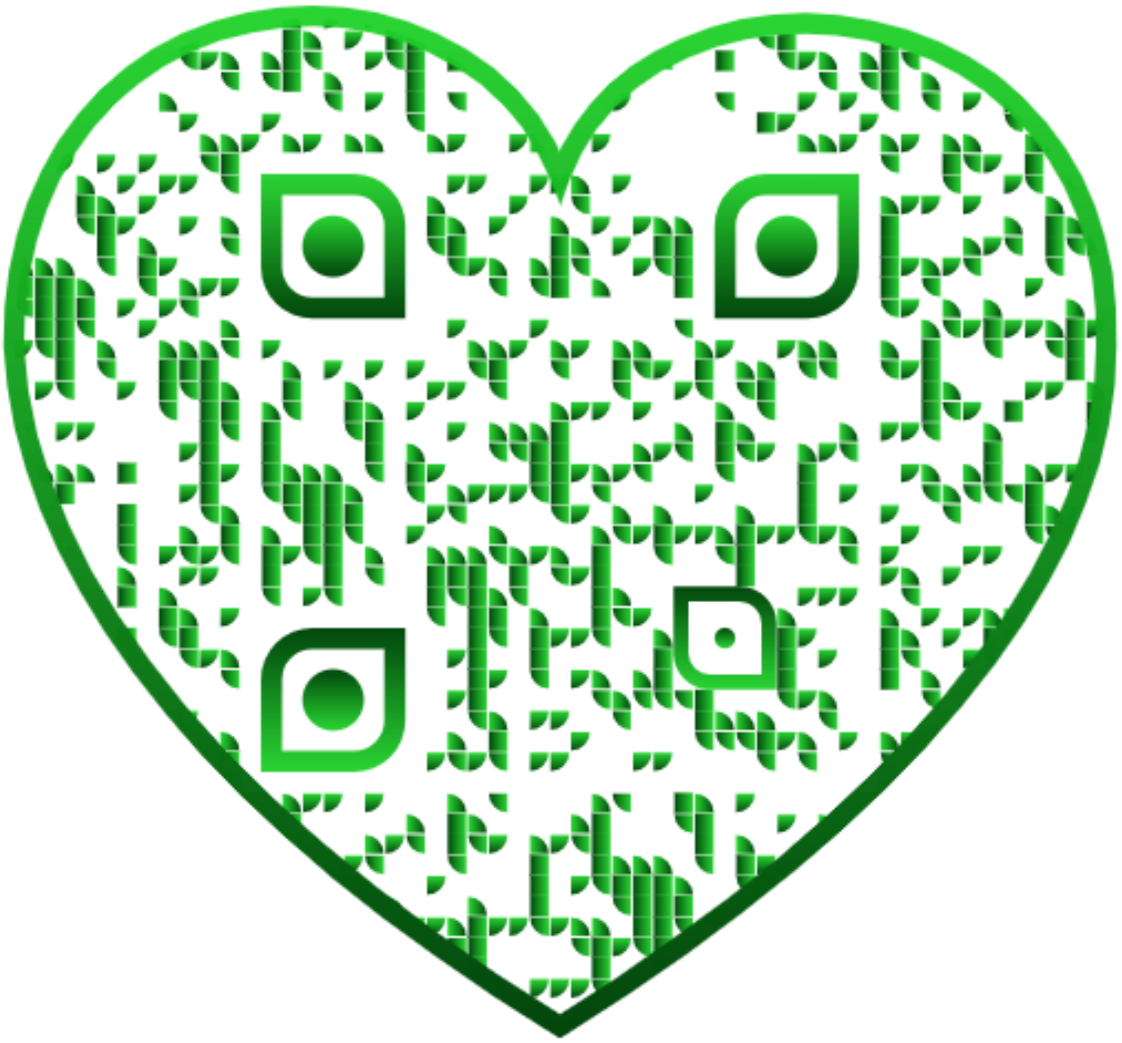

- Radiographic studies are helpful in neoplastic and inflammatory conditions.
- Many agents, including antibiotics, cause diarrhea (**Table 23-1**). Laxative abuse for weight loss may also result in diarrhea.

TABLE 23-1

Drugs Causing Diarrhea

Laxatives
Antacids containing magnesium
Antineoplastics
Auranofin (gold salt)
Antibiotics
Clindamycin
Tetracyclines
Sulfonamides
Any broad-spectrum antibiotic
Antihypertensives
Reserpine
Guanethidine
Methyldopa
Guanabenz
Guanadrel
Angiotensin-converting enzyme inhibitors
Cholinergics
Bethanechol
Neostigmine
Cardiac agents
Quinidine
Digitalis
Digoxin
Nonsteroidal anti-inflammatory drugs
Misoprostol
Colchicine
Proton pump inhibitors
H2-receptor blockers

TREATMENT

- Goals of Treatment: To manage the diet, prevent excessive water, electrolyte, and acid–base disturbances; provide symptomatic relief; treat curable causes; and manage secondary disorders causing diarrhea. Diarrhea, like a cough, may be a body's defense mechanism for ridding itself of harmful substances or pathogens.

GENERAL APPROACH

- Dietary management is a first priority in the treatment of diarrhea. Feeding should continue in children with acute bacterial diarrhea (**Figs. 23-1**

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and 23-2).

- If vomiting is present and is uncontrollable with antiemetics, nothing is taken by mouth. As bowel movements decrease, a bland diet is begun.
- Rehydration and maintenance of water and electrolytes are the primary treatment measures until the diarrheal episode ends.
- If the patient is volume-depleted, rehydration should be directed at replacing water and electrolytes to normal body composition. Then, water and electrolyte composition are maintained by replacing losses.
- If vomiting and dehydration are not severe, enteral feeding is the less costly and preferred method. In the United States, many commercial oral rehydration preparations are available (**Table 23-2**). The WHO now recommends an oral rehydration solution (ORS) with a lower osmolarity, sodium content, and glucose load (see **Table 23-2**).
- Oral supplementation of zinc 20 mg daily for 10 days in addition to ORS significantly reduces the severity and duration of acute diarrhea in developing countries.

FIGURE 23-1

Recommendations for treating acute diarrhea. Follow these steps: (1) Perform a complete history and physical examination. (2) Is the diarrhea acute or chronic? If chronic diarrhea, go to Fig. 23-2. (3) If acute diarrhea, check for fever and/or systemic signs and symptoms (ie, toxic patient). If systemic illness (fever, anorexia, or volume depletion), check for an infectious source. If positive for infectious diarrhea, use the appropriate antibiotic/anthelmintic drug and symptomatic therapy. If negative for infectious cause, use only symptomatic treatment. (4) If no systemic findings, use symptomatic therapy based on severity of volume depletion, oral or parenteral fluid/electrolytes, antidiarrheal agents (see Table 23-3), and diet.

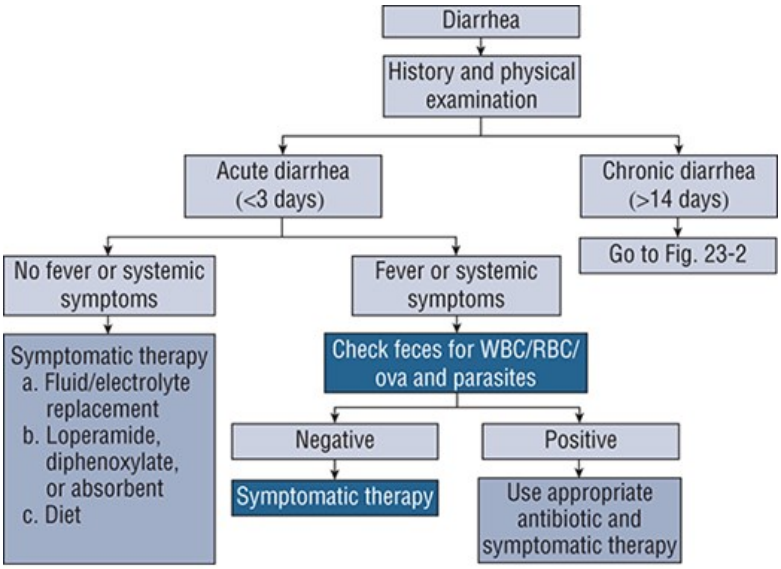

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FIGURE 23-2

Recommendations for treating chronic diarrhea. Follow these steps: (1) Perform a careful history and physical examination. (2) The possible causes of chronic diarrhea are many. These can be classified into intestinal infections (bacterial or protozoal), inflammatory disease (Crohn's disease or ulcerative colitis), malabsorption (lactose intolerance), secretory hormonal tumor (intestinal carcinoid tumor or vasoactive intestinal peptide [VIP]–secreting tumors), drug (antacid), factitious (laxative abuse), or motility disturbance (diabetes mellitus, irritable bowel syndrome, or hyperthyroidism). (3) If the diagnosis is uncertain, appropriate diagnostic studies should be ordered. (4) Once diagnosed, treatment is planned for the underlying cause with symptomatic antidiarrheal therapy. (5) If no specific cause can be identified, symptomatic therapy is prescribed.

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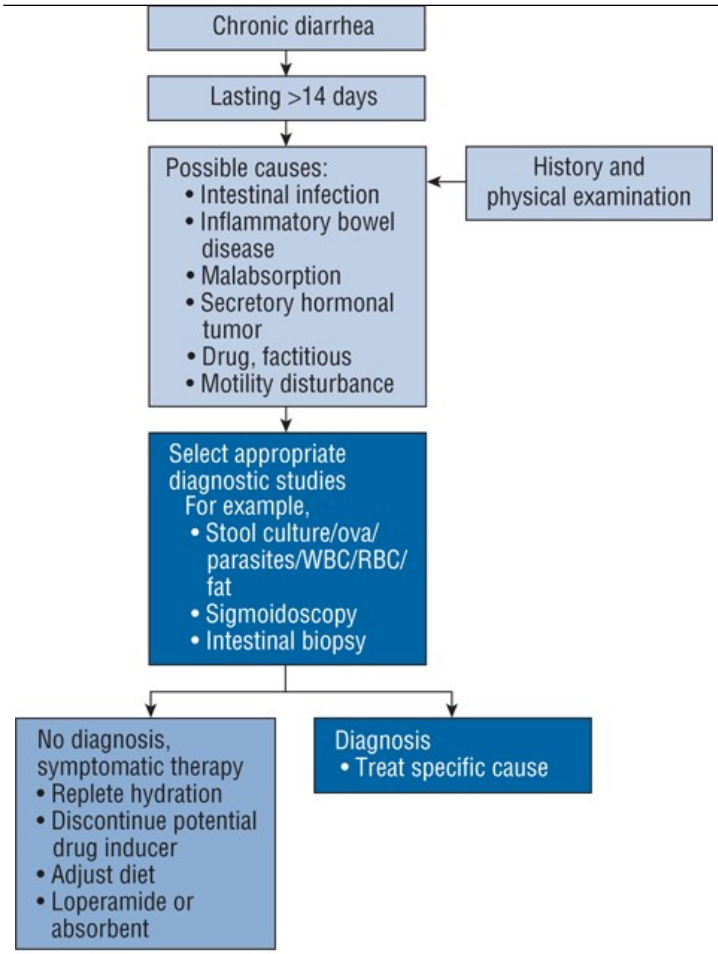

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TABLE 23-2

Oral Rehydration Solutions

	WHO-ORS[a]	Pedialyte[b] (Ross)	CeraLyte (Cera Products)	Enfalyte (Mead Johnson)
Osmolality (mOsm/kg or mmol/kg)	245	250	220	167
Carbohydrates[b] (g/L)	13.5	25	40[c]	30[c]
Calories (cal/L [J/L])	65 (272)	100 (418)	160 (670)	126 (527)
Electrolytes (mEq/L; mmol/L)				
Sodium	75	45	50–90	50
Potassium	20	20	20	25
Chloride	65	35	40–80	45
Citrate	—	30	30	34
Bicarbonate	30	—	—	—
Calcium	—	—	—	—
Magnesium	—	—	—	—
Sulfate	—	—	—	—
Phosphate	—	—	—	—

[a]World Health Organization reduced osmolarity oral rehydration solution.

[b]Carbohydrate is glucose.

[c]Rice syrup solids are carbohydrate source.

PHARMACOLOGIC THERAPY

- Drugs used to treat diarrhea are listed in **Table 23-3**. Usually, these drugs are not curative but palliative.
- Opiates and opioid derivatives delay the transit of intraluminal content or increase gut capacity, prolonging contact and absorption. The limitations of opiates include the potential for misuse and the risk of worsening diarrhea in selected infectious diarrheas.
- **Loperamide** is often recommended for managing acute (including traveler's diarrhea) and chronic diarrhea. Diarrhea lasting 48 hours beyond initiating loperamide warrants medical attention.
- **Diphenoxylate and difenoxin (a diphenoxylate derivative)** are combined with **atropine** and have the same uses, precautions, and side effects.

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- Polycarbophil absorbs 60 times its weight in water and can treat both diarrhea and constipation.
- **Bismuth subsalicylate** is often used for the treatment or prevention of diarrhea (traveler's diarrhea) and has antisecretory, anti-inflammatory, and antibacterial effects. It contains multiple components that might be toxic if given in excess to prevent or treat diarrhea.
- **Probiotics**, including microorganisms such as *Saccharomyces boulardii*, *Lactobacillus* GG, and *Lactobacillus acidophilus* decrease the duration of infectious and antibiotic-induced diarrhea in adults and children. The dosage of probiotic preparations varies depending on the brand used. Intestinal flatus is the primary patient complaint experienced with this modality.
- **Octreotide**, a synthetic octapeptide analog of endogenous somatostatin, is prescribed for the symptomatic treatment of carcinoid tumors and other peptide- secreting tumors, dumping syndrome, and chemotherapy-induced diarrhea. The dosage range for managing diarrhea associated with carcinoid tumors is 100–600 mcg daily in two to four divided doses, subcutaneously, for 2 weeks. Octreotide is associated with adverse effects such as cholelithiasis, nausea, diarrhea, and abdominal pain.
- Vaccines. An oral vaccine for cholera (Vaxchora) is licensed and available in the United States. The Advisory Committee for Immunization Practices (ACIP) recommends the vaccine for adults aged 2–64 years old who are traveling to an endemic area. Two orally administered rotavirus vaccines (RotaTeq and Rotarix) prevent gastroenteritis due to rotavirus infection in infants and children. There are two typhoid vaccine formulations: one is a parenteral inactivated whole-cell vaccine approved as a single dose in children aged 2 and older and adults, and the other is an oral live-attenuated (Ty21a) vaccine that is approved for adults and children aged at least 6 years and is administered in four doses on alternating days over 1 week.

TABLE 23-3

Selected Antidiarrheal Preparations

	Dose Form	Adult Dose
Antimotility		
Diphenoxylate	2.5 mg/tablet 2.5 mg/5 mL	5 mg four times daily; do not exceed 20 mg/day
Loperamide	2 mg/capsule (various strength suspensions)	Initially 4 mg, and then 2 mg after each loose stool; do not exceed 16 mg/day
Paregoric (morphine)	2 mg/5 mL (morphine)	5–10 mL one to four times daily
Opium tincture (morphine)	10 mg/mL (morphine)	0.6 mL four times daily
Difenoxin	1 mg/tablet	Two tablets, and then one tablet after each loose stool; up to eight tablets per day
Adsorbents		
Kaolin-pectin mixture	5.7 g kaolin + 130.2 mg pectin / 30 ml	30–120 mL after each loose stool
Polycarbophil	500 mg tablet	Chew two tablets four times daily or after each loose stool; do not exceed 12 tablets per day
Attapulgite	750 mg/15mL 300mg/7.5mL	1200–1500 mg after each loose stool or every 2 hours; up to 9000 mg/day

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	300, 600, 750 mg tablets	
Antisecretory		
Bismuth subsalicylate	1050 mg/30 mL 262 mg/15 mL 524 mg/15 mL 262 mg/tablet	Two tablets or 30 mL every 30 minutes to 1 hour as needed up to eight doses per day
Enzymes		
Lactase	1250 neutral lactase units/4 drops	Three to four drops taken with milk or dairy product
	3300 FCC lactase units per tablet	
Bacterial replacement (*Lactobacillus acidophilus*, *Lactobacillus bulgaricus*)		Two tablets or one granule packet three to four times daily; give with milk, juice, or water
Octreotide	0.05 mg/mL 0.1 mg/mL 0.5 mg/mL	Initial: 50 mcg subcutaneously One to two times per day and titrate dose based on indication up to 600 mcg/day in two to four divided doses

EVALUATION OF THERAPEUTIC OUTCOMES

- Therapeutic outcomes are directed to key symptoms, signs, and laboratory studies. The constitutional symptoms usually improve within 24–72 hours. Monitoring for changes in the frequency and character of bowel movements on a daily basis in conjunction with vital signs and improvement in appetite are of utmost importance.
- Monitor body weight, serum osmolality, serum electrolytes, complete blood cell count, urinalysis, and cultures (if appropriate). With an urgent or emergency situation, any change in the volume status of the patient is the most important outcome.
- In the urgent/emergent situation, restoration of the patient's volume status is the most important outcome. Toxic patients (fever dehydration, hematochezia, or hypotension) require hospitalization, IV fluids and electrolyte administration, and empiric antibiotic therapy while awaiting culture and sensitivity results. With timely management, these patients usually recover within a few days.

See Chapter 57, Diarrhea, Constipation, and Irritable Bowel Syndrome, authored by Patricia H. Fabel and Kayce M. Shealy, for a more detailed discussion of this topic.

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